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OCCURRENCE OF GROUND SHARKS, *CARCHARHINUS*, IN GREAT SOUTH BAY.

For the past fifteen years I have harpooned sharks in Great South Bay, Long Island, New York, and during that period there have been seen from my boat probably not less than twenty-five hundred between Lindenhurst and Great River on the north side of the Bay and Cedar Island and Cherry Grove on the south side. I think it is conservative to say that between three hundred and fifty and four hundred have been killed. The greatest number seen in any one year of which I have a record was 277 in 1916 and the greatest number killed was 60 in 1906. Not counting smaller Sand Sharks (*Carcharias taurus*)[1] those killed have been of two species, namely the Brown Shark (*Carcharhinus milberti*)[1] and the Dusky Shark (*Carcharhinus obscurus*)[1] with the single exception of a male *Carcharhinus limbatus*[2] taken July 14th, 1910. This fish, the longest I have ever secured, measured 9 ft. 2 in. and weighed 300 lbs. A single small Hammerhead (*Sphyrna zygaena*)[1] *about* 2½ ft. long was seen but not taken.

[1]Brooklyn Museum Science Bulletin, Vol 3, No. 1.

[2]Identified by J. T. Nichols after an examination of the jaws.

Beginning with the year 1911 careful records have been kept, during which time dates for the sharks seen range from June 17th to September 6th. It is my distinct remembrance that in a previous year I have killed them as late as September 15th. The sharks taken were *Carcharhinus*[1] and those noted as seen, with the exception of the small Hammerhead, were undoubtedly the same.

During the years from 1911 to 1916, inclusive, I went out on 123 occasions, frequently for a small portion of the day as weather conditions were unfavorable. About 1123 were seen, and 146 were taken. Of these 146 only 7 were males. The females taken were all *C. milberti*. Two of the males were C. *milberti* and measured 7 ft. and 6 ft. 6 in., the latter weighing 121 pounds, and 5 were *C. obscurus* which measured 8′, 8′ 2″, 8′ 5″, 8′ 3″ 7′ 8″.

The	8′ 2″	specimen	weighed	275 lbs.
"	8′ 5″	"	"	322 "
"	8′ 3″	"	"	312 "
"	7′ 8″	"	"	250 "

The earliest any male was taken was August 3d, and the latest, August 29th.

The females ranged in length from 5′ 4″ to 7′ 8″.

A	6′ 1″	specimen	weighed	95 lbs.
"	6′ 9″	"	"	142 "
"	6′ 9″	"	"	125 "
"	6′ 10″	"	"	124 "
"	6′ 11″	"	"	125 "
"	7′	"	"	136 "
"	7′ 2″	"	"	184 "

Eight of the females contained young and were taken from June 22d to August 5th. Eight was the smallest number and eleven the greatest number of young, and of a total of 75 young 31 were males and

44 females. The young when born are about 22 inches long and weigh 2½ lbs.

On one occasion when a female shark was suspended by the tail, three young dropped from her mouth one at a time, and swam off apparently unhurt. This is the only incident of the kind I have known. The same fish contained several unborn young. Young are sometimes born on deck, tail first, after the mother has been caught.

The principal diet of the sharks I have examined has been various bottom fish and an occasional weak fish, dog fish, eel or crab. Flat-fish very largely predominate. I have never found what could be identified as a blue fish, nor have I ever found anything except what is mentioned above in a shark's stomach, except two fish hooks with the snells attached, neither of which was imbedded and which were probably fast to some smaller fish which the shark had swallowed.

The greatest number of sharks I have ever taken on any one day was 17 on August 3d, 1905. Some of these, however, were Sand Sharks. On August 11th, 1906, fourteen Brown Sharks were taken. The greatest number seen in one day of which I have a record was 82, on August 14th, 1916, and of these 42 were in sight at one time. These were all seen in the morning before noon. On a previous occasion when I kept no record, my captain at the mast head said he thought he saw during the day, over three hundred. I would say a conservative estimate was two hundred as they were much more plentiful on that day than on the day that 82 were seen. They were so thick at times that it would have been impossible to count them with any degree of accuracy.

I have killed approximately as many on the ebb tide as on the flood.

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REMARKS ON SHARKS TAKEN IN GREAT SOUTH BAY.

During the past years the writer has made several trips on Great South Bay, Long Island, from Babylon with Mr. Edwin Thorne in pursuit of ground sharks (*Carcharhinus*). The most successful day's hunting he has experienced was on July 27, 1916, when five female *Carcharhinus milberti* from 6 ft. 1 in. to 6 ft. 11 in. in total length were taken. As the five sharks lay together on deck some individual variation was evident. One of them had a distinctly long caudal, one was notably heavy, another, the most aberrent of the five was slender. It differed from the others slightly in color, the under surface of the pectoral terminally having an ill-defined dusky blotch, rather than being shaded with the color of the upper parts as in them. In the jaw of this specimen the re-entrance in the lateral margin of the upper teeth comes to a sharper apex. The dermal denticles under the microscope are essentially the same, but with ridges slightly less sharp. These differences are too slight to be of specific value. All five had the proportionate length of the dorsal and pectoral similar, the dorsals in the predorsal length 1.6 to 1.7 times, pectorals in the same 1.15 to 1.3. Second dorsal and anal were of approximately the same size and nearly apposed, the anal very slightly in advance in all but one in which the second dorsal was slightly in advance. The anal was of the same form throughout, bilobed, the anterior lobe rounded. In the water the sharks looked brownish grey to my eye, although their appearance varies considerably according to whether they are seen against light or dark bottom, on deck mostly grey-blue above.

It is remarkable that whereas the female sharks taken by Mr. Thorne have all been *C. milberti,* five of the seven males taken in six years have been *C. obscurus.* One of these was taken on August 3, 1916, and examined by the writer on the following day.

It had a considerably smaller dorsal than female *C. milberti,* proportionately longer lower caudal lobe, and the second dorsal was noticeably more advanced than the anal in position. The head was strikingly blunter and more rounded than in female *C. milberti,* as well as the fish being of heavier build. The jaws and teeth are much larger than those of female *C. milberti.*

Mr. Thorne had made the following measurements of this male shark, made along the curve (except total length). Total length 8 ft. 1 in.; head and body along the back, 6 ft. 1 in.; dorsal fin, from snout, 2 ft. 6 in.; dorsal from base of tail, 2 ft. 9½ in.; length of front of dorsal, 1 ft. 2½ in.; top of caudal, 2 ft. 1½ in.; front of pectoral fin, 1 ft. 9 in.; pectoral, from snout, 2 ft.; ventrals from snout, 4 ft. 1 in.; circumference at root of tail, 1 ft. 1½ in.; at front of dorsal, 4 ft. 4⅛ in.; at eye, 2 ft. 5 in.; eye to snout, 8¼ in.; mouth to snout, 6 in.

On August 29, 1916, a male *C. milberti* was taken of which Mr. Thorne made the following corresponding measurements: Total length, 6 ft. 6 in.; head and body, along the back, 5 ft. 2 in.; dorsal fin, from snout, 2 ft.; dorsal from base of tail, 2 ft. 5 in.; length of front of dorsal, 1 ft. 1 in.; top of caudal, 1 ft. 7 in.; front of pectoral fin, 1 ft. 5½ in.; pectoral, from snout, 1 ft. 7½ in.; ventrals from snout, 3 ft. 6 in.; circumference at root of tail, 9½ in.; at front of dorsal, 2 ft. 8 in.; at eye, 1 ft. 8 in.; eye to snout, 6½ in.; mouth to snout, 5 in.; weight, 121 lbs. Mr. Thorne further informs me that this fish resembled the females of *C. milberti,* except that it seemed slightly lighter in color, and differed from the males of *C. obscurus.* Its eyes were pale yellowish in color like female *C. milberti* and like a male *C. limbatus* which he has taken, whereas the eyes of males of *C. obscurus* are dark brown.

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AN INSTANCE OF ALBINISM IN THE WESTERN GOPHER SNAKE.

Cases of complete albinism are fairly common among wild birds and mammals, and a large number of instances have been recorded by various observers, but reports of this condition in reptiles are quite rare; there are but few records from Europe and only a single one from America so far as the writer knows. It becomes of interest therefore to report a case of albinism (complete for one color) occurring in the Western Gopher Snake [*Pituophis catenifer* (Blainville)].

The specimen under discussion was captured in a dormant state at Pescadero, a coastal locality in San Mateo County, California, early in November, 1913, on black adobe soil where gopher snakes were said to be fairly common. The snake was kept alive for more than a year and is now in the reptile collection of the Department of Zoology of the University of California.

The coloration of a typical gopher snake seems to be made up of three distinct materials: a yellow deposit found generally distributed in the scales of the body and forming the ground color, and two darker pigments, a red and a black, occurring locally and forming the contrasted part of the color pattern. The yellow pigment is present in the scales of the albino specimen as is also (in part at least) the red, but the black is entirely lacking. Upon the anterior portion of the body, where ordinarily the black and red together form brown spots only the red is present, and on the tail where a normal specimen is black, only pale bluish or uncolored areas are to be seen. The iris and tongue which are normally dark shared in the loss of color and were of a light pinkish cast. Evidently the factor controlling the formation and deposition of black pigment failed of operation throughout the entire body.

Accompanying this abnormality in coloration there were irregularities in scale pattern, especially on the head, which suggests that whatever cause operated to prevent the formation of black pigment also may have had some effect on scale formation. Several of the head scales are of quite different shape than those found on a normal specimen, and some show suggestions of divisions which were not completed. There are four postoculars, where but three normally occur. The body scales, save for the interpolation of an incomplete gastrotege which extends but half way across the body, are quite typical and numerically are within the limits given by Cope. (The Crocodilians, Lizards and Snakes of North America, Ann. Rept. Smithsonian Inst., for 1898, 1900, pp. 877, 878), viz: Dorsal scale rows, 31 (Cope, 29-33); gastrosteges, 223½ (204-245); urosteges, 64 (56-72).

This snake was kept in captivity for more than a year, confined in a glass terrarium with a screened top. It was provided with water and at intervals small white mice were fed to it; one of these bit the snake on the head and produced a "scalp" wound. One morning after the animal had been in captivity for about four months the skin on the preorbital portion of its head was seen to be free from the scales beneath. Some straw was placed in the terrarium and within a few minutes the snake was working rapidly back and forth through the straw, freeing itself from the old skin. At the place where its body was just being freed from the skin, violent muscular expansions and contractions were being executed. The surface of the snake's body and the outside, originally the inside, of the sluffed skin were noticeably moist as a result of the secretion which had been poured out to assist in moulting. For several weeks previous to moulting the snake had been quite sluggish, remaining coiled in one corner of the terrarium and refusing food. During this time its eye became grad-

ually dulled and the skin was seen to be free from the body in several places. Immediately after the moult the animal became very active.

Several European observers, among them notably Boulenger, Tornier and Werner have reported instances of albinism among snakes, and I have found a number of other European titles on the subject. Opinion, so far as expressed by the latter two workers, seems to be that albinism results from a shortage of yolk in the developing embryo, a supposition which would be in accord with the fact that albino animals are often of smaller size and of a more delicate nature than normal individuals of their species. Perhaps some light could be had on this problem by crossing albino snakes with normally colored individuals of the same species as has been done with trout among fish, and with various species among the higher vertebrates.

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